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GIFT OF
Bion J. Arnold.

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REPORT

GIVING

SPECIFICATIONS

FOR

RECONSTRUCTION AND EXTENSION

OF THE

PROPERTIES

OF THE

CHICAGO STREET RAILWAY COMPANIES

BEING

EXHIBITS B

OF ORDINANCES

SUBMITTED TO

THE COMMITTEE ON LOCAL TRANSPORTATION

OF THE

CHICAGO CITY COUNCIL

BY

BION J. ARNOLD
Nov. 21st, 1905

ARNOLD REPORT No. 7

REPORT

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BION J. ARNOLD
Nov. 21st, 1905

ARNOLD REPORT No. 7

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Gift of Mr B. J. Arnold

MEMBERS OF THE COMMITTEE ON LOCAL TRANSPORTATION OF THE CITY COUNCIL OF THE CITY OF CHICAGO.

HON. CHARLES WERNO, CHAIRMAN.

HON. ROBERT R. McCORMICK
HON. WILLIAM E. DEVER
HON. NICHOLAS R. FINN
HON. THOMAS CAREY
HON. MICHAEL ZIMMER
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HON. THOMAS M. HUNTER
HON. LINN H. YOUNG

REPORT NO. 7.

Chicago, Nov. 21, 1905.

Hon. Chas. Werno, Chairman, and Members
of the Local Transportation Committee,
Chicago City Council.

Gentlemen:—I have the honor to submit herewith my Report No. 7 describing the class of construction which it is expected the Chicago City Railway Company, the North Chicago Street Railroad Company and the West Chicago Street Railroad Company and their allied interests, will use in the rehabilitation and extension of their properties in order to comply with the ordinances now pending before you.

The specifications accompanying this report when finally adopted are to become "Exhibits B" of the ordinances of the respective companies.

Respectfully submitted,

Bion J. Arnold

Consulting Electrical Engineer.

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UNIV. OF CALIFORNIA

EXHIBIT B

CHICAGO CITY RAILWAY COMPANY.

Specifications for Reconstruction and Extensions.

IN GENERAL.

The intention of these specifications is to cover, in a general way, the character and scope of the work to be undertaken and carried out by the Chicago City Railway Company, in the improvement of its property to such an extent that the Company will be able to render to the citizens of Chicago the quality and kind of service contemplated by the accompanying ordinance.

UNDERGROUND CONDUIT CONSTRUCTION.

All the underground conduit construction provided for in the ordinance herewith shall conform to the following general specifications:

RAILS.

The rails shall be of steel, shall be not less than nine (9) inches in height, shall weigh not less than one hundred twenty (120) pounds per yard, and shall be of the "Trilby" type, in which when new, the difference between height of lip and tread shall not be less than three thirty-seconds (3/32) of an inch, or more than six thirty-seconds (6/32) of an inch, and the depth of the groove below the head of the rail, when new, shall not be more than one and one-quarter (1¼) inches.

SLOT RAILS.

Slot rails shall be of the "Z" form, made of steel, shall weigh not less than fifty-seven (57) pounds per yard, and shall be suitably joined by means of bolts and splices.

CONDUCTOR BARS.

Conductor bars shall be of the "T" section, made of steel, shall weigh not less than twenty-one (21) pounds per yard, shall be supported upon suitable insulators spaced not more than fifteen (15) feet apart, and shall be joined together in such a manner as to properly carry the electric current without excessive leakage.

JOINTS.

All rail joints shall be either cast welded, electrically welded, or of a type which will give an equally smooth and even joint.

CAST IRON YOKES.

The yokes shall be of cast iron properly spaced not more than five (5) feet center to center, and shall weigh not less than four hundred fifty (450) pounds each.

GENERAL CLAUSE.

The above rails and yokes shall be supported upon and carried in a concrete roadbed of sufficient strength to sustain the surface load, and provided with man-holes and vaults, properly connected with the city sewers and spaced close enough together to effectively drain the conduits carrying the working conductors and the conduits carrying the feeder and transmission system.

The rails shall be joined to the yokes by means of suitable bolts and lock nuts, and to the slot rails by means of suitable tie bars properly spaced, and in such a manner that they will preserve the opening between the slot rails so that it shall not exceed seven-eighths (7/8) of an inch.

At all points where the working conductor is carried upon insulators, there shall be provided a suitable cast-iron frame and cover of sufficient size to provide easy access to the insulator. All man-holes, sewer connections and other openings exposed to the street surface shall be provided with suitable cast-iron frames and covers, which, together with the frames and covers for the insulators, shall be of ample strength to effectually resist the strains imposed upon them by the heaviest street loads.

SPECIAL WORK.

At all points of intersection of the tracks of the Company with its own tracks or with the tracks of other companies, there shall be provided suitable steel special-work of ample strength and weight to correspond with the rails to which it connects. The frogs, switches and mates shall be provided with wearing plates of hardened steel; and in no case shall rails used in the special-work be of less weight per foot than the weight of the rails to which they join. All special-work and curves shall be laid in concrete in the same general manner required for straight-line track.

PITS AND TERMINALS.

At all points where the underground conduit construction terminates and overhead construction begins, the Company shall construct suitable pits underneath the tracks, of ample size to provide for the removal or the adjustment of the plows attached to the cars. These pits shall be built of brick, concrete or masonry in a thoroughly substantial manner, and shall be of ample strength to effectually resist the heaviest traffic of the streets in which they are laid; it being understood that the construction of these pits shall interfere as little as practicable with the use of the streets for general traffic purposes at the points where the pits are built.

The Company shall also provide suitable plow-hatches, spaced with sufficient frequency to preserve regular and uninterrupted operation of the cars; it being understood that these hatches except at special-work shall not be closer than two thousand (2,000) feet apart.

All covers, man-holes, hatches, pits, conduits, etc., shall be maintained in good order by the Company, and in such a manner as not to interfere with street traffic.

PAVING.

Paving to be laid in connection with underground conduit construction shall conform to the following detailed specifications:

Granite paving blocks shall be used having a uniform grain and texture, without lamination or stratification, and free from an excess of mica or feldspar. Said blocks shall measure from three and one-half (3½) to five and one-half (5½) inches in width, from seven (7) to eleven (11) inches in length (except that shorter stones may be used to break joints), and not less than five (5) inches in depth. They shall be so dressed as to have substantially rectangular plane surfaces, so that when in place the joints at the ends and sides shall average one-quarter (¼) inch in width. Soft or weather-worn stones obtained from the surface of the quarry, and stones which wear to a polish under traffic shall not be used. All blocks shall be laid in uniform courses across the roadway and the space between the blocks, when in place, shall in no case be less than one-eighth (⅛) of an inch nor more than three-eighths (⅜) of an inch in width. Each course shall consist of blocks of the same width. They shall be so laid that all longitudinal joints shall be broken by a lap of approximately three (3) inches. The spaces shall be immediately filled to within two (2) inches of the top of the blocks with dry gravel free from loam and dirt, and the blocks rammed to a true surface and firm bed with a seventy-five (75) pound rammer of approved shape. No cracked or chipped blocks shall remain in the pavement. After ramming, the spaces between the blocks shall be completely filled with a paving pitch made by the distillation of "straight run" coal tar and of such quality and consistency as shall be approved by the Commissioner of Public Works. The pitch shall be used at a temperature of not less than two hundred eighty degrees (280°) Fahrenheit and be spread in such quantity as to apply two (2) gallons to each square yard of pavement. The spreading shall be done in sections if the Commissioner of Public Works so directs.

OVERHEAD ELECTRIC CONSTRUCTION.

All cable track of the Company shall be reconstructed and converted into electric track, and all cable track not designated for underground conduit construction shall be provided with overhead electric construction conforming to the following general specifications, which shall also apply to the reconstruction of any of the present tracks to be operated by electric power from overhead construction and to all additional tracks or extensions to be so operated:—

RAILS.

On all of said streets or portions thereof where granite, asphalt or brick pavement is laid upon a concrete foundation, a Trilby rail of the section used for underground conduit construction, weighing not less than one hundred twenty (120) pounds per yard shall be laid; but a girder type of rail not less than seven (7) inches in height, and weighing not less than eighty-five (85) pounds per yard having a tram of not less than two and three-quarters (2¾) inches may be used on the streets or portions thereof not so paved, provided the difference in elevation between the head of the rail and the wagon tread is not more than one and one-quarter (1¼) inches, when the rail is new, and provided further, that at such times as the streets on which the girder rail is laid are paved with granite, asphalt, brick, creosoted block or other similar material on concrete foundation, the Company will substitute Trilby rails of the section used for underground conduit construction weighing not less than one hundred twenty (120) pounds per yard of the above-mentioned type, but the Company shall not be compelled, on account of the paving or repaving of any street, to remove good serviceable rails before being worn out.

JOINTS.

Same as given for underground conduit construction, except that the joint used must be one which will provide a carrying capacity for the electric current equivalent to the carrying capacity of the rail itself.

FOUNDATIONS.

The rails shall be laid upon concrete beams, wooden ties, steel ties or cast-iron chairs or in any other form of first-class modern approved street-railway track construction.

PAVING.

The paving in all cases where the said streets or portions thereof are paved with granite, asphalt or brick pavement on a concrete foundation shall comply with the detailed specifications for granite-block pavement as above. If such street paving alongside of tracks shall be asphalt pavement the rails shall be lined on the outside with a ribbon of such granite pavement twelve (12) inches wide.

BONDING AND CROSS-BONDING.

In case the rails are joined by any other form of joint than a cast-welded or electrically-welded joint, there shall be some form of bond used which will connect the ends of the rails together in such manner that the conductivity of the joints shall be equal to the conductivity of the rail. The rails of each single track and the inside rails of the double track of all tracks having overhead electric construction shall be connected together by cross-bonds of No. 2/0 (B. & S. gauge) copper wire spaced not more than one thousand (1,000) feet apart, and properly secured to the rails in such manner that the full conducting effect of the wire may be utilized. The rails shall be so bonded or joined and such return circuits and other necessary devices installed as to reasonably and effectually prevent damage from electrolysis.

OVERHEAD CONSTRUCTION.

All new overhead construction shall consist of one (1) trolley wire suspended over each track by span wires attached to poles set at the curb-line or suspended from brackets attached to poles.

Poles shall be of iron or steel weighing approximately nine hundred (900) pounds each, set in concrete and kept thoroughly painted. They shall be spaced on an average of from one hundred ten (110) to one hundred fifteen (115) feet apart for straight track, except at street intersections, and so as not to obstruct cross streets, alleys, or private driveways. The location of poles shall be determined by the Commissioner of Public Works.

All material used in the overhead construction shall be of the most modern type and shall be capable of sustaining all the weights and strains that come upon it under normal conditions of operation and from wind, sleet and ordinary accidents.

The trolley wires shall be No. 2/0 (B. & S. gauge) hard-drawn copper. Phosphor bronze, silicon bronze, or other material equal in strength and conductivity may also be used. Trolley wires shall be suspended not less than eighteen and one-half (18½) feet above the rails. There shall be at least two (2) insulations between the trolley wire and the supporting pole. Span wires shall be galvanized steel.

All feeder wires, not required by the accompanying ordinance to be placed under ground, shall be suspended by insulators upon said poles supporting said trolley wires or upon poles placed at the side of streets, alleys or other public ways in locations to be approved by the Commissioner of Public Works. These wires and poles shall be so situated that the Company may make conveniently all the connections provided for in Section 4 of said ordinance. The said trolley wires, feeder wires and all other wires authorized by said ordinance to be installed by the Company may, where located in streets, alleys, or other public ways in, along or across which are located railroads, elevated above the surface of the streets, be strung upon or from the structure of such railroads, with the consent of the company owning or operating the same. Said wires shall be attached to said structures and maintained under the supervision of the City Electrician.

Underground conduits to carry any of the wires authorized by said ordinance to be installed by the Company, shall not exceed four (4) feet in width and three (3) feet in depth, and shall be of tile, cement, iron or other material impervious to moisture and not subject to decay. All transmission and feeder wires and cables laid under ground shall be covered with lead or other impervious material. Before any cable containing such wires shall be put in use it shall be tested by an alternating current of twice the working voltage of the cable. All forms of cable used by the Company containing more than one conductor shall be tested in like manner.

Wentworth Avenue and Halsted Street between 39th Street and 63d Street shall not be used for through trunk line overhead feeders but for overhead local distribution feeders only.

GENERAL.

SPACING OF TRACKS.

In laying or relaying rails in any of the streets included in the accompanying ordinance upon which more than one track is to be built the distance between centers of tracks may remain as at present but in order to accommodate large, modern cars and provide for their safe passage this distance shall be at least nine (9) feet eight and one-half (8½) inches between center lines of tracks. The exact location of tracks in the streets shall be subject to the approval of the Commissioner of Public Works.

POWER HOUSE AND SUB-STATIONS.

The present cable plants for supplying power shall be abandoned as soon as practicable and in place thereof one or more electric plants shall be substituted, owned and operated either by the Company or by some other company, capable of furnishing reliable service, and which, together with the necessary sub-stations shall be of sufficient capacity to supply the requisite amount of power to efficiently, successfully and continuously operate not less than six hundred eighty-two (682) double-truck cars and the two hundred fifty-one (251) single-truck cars hereinafter mentioned.

In the construction of such plants and sub-stations, the Company shall comply with all general ordinances of the city in regard to buildings and to the installation of machinery, boilers and smoke-consuming appliances. The buildings of said power plants shall be substantially fire-proof and supplied with smoke-stacks sufficient to carry off all gases emitted, and the foundations for the machinery therein shall be constructed in a solid and substantial manner.

The machinery and apparatus employed shall be selected and installed with a view of affording uninterrupted operation of the cars upon said railways, and to attain this end the machinery shall be so arranged that a stoppage of one machine shall not prevent the operation of the remaining machines, and reserve machinery shall always be ready to be thrown into service. All boilers, piping, valves, fittings, steam engines, turbines, generators, switchboard apparatus, and other appliances used, shall be of the latest and most approved design and constructed and installed in accordance with the best engineering practice.

In all dynamos and connections where a high-voltage current is produced or used approved methods for the protection of human life shall be employed.

The high-tension switches shall be entirely enclosed in fire-proof material, and shall be operated by levers, compressed air, auxiliary currents, or by such other means as will, as far as practicable, prevent personal contact with high-tension current.

All feeders leading out of power plants and sub-stations, shall be provided with some form of safety switches or automatic circuit-breakers designed to instantaneously open the circuit in case of a short circuit occurring on the feeder or on the trolley wire which it feeds.

All the foregoing specifications regarding modern and approved apparatus, protection from fire, and provisions for the protection of human life, shall apply with equal force to the sub-stations in case a system of transmission involving the use of sub-stations is adopted.

CAR SHOPS AND MACHINERY.

It is contemplated that the present car shops and machinery contained therein will remain as at present installed and located as follows:

Complete plant fronting on Vincennes Road at the corner of Seventy-eighth Street, extending from Vincennes Road to Wentworth Avenue.

CARS.

The Company shall put into service as rapidly as practicable and operate on its street-railway system six hundred eighty-two (682) or more double-truck cars, each capable of seating from forty (40) to fifty-two (52) passengers. These cars shall have center aisles and cross seats, which shall face forward, except that longitudinal seats, seating not to exceed four (4) people, may be used at each end of the car and on each side of the car immediately inside the entrances. They shall be vestibuled and shall be supplied with a sufficient number of electric bells, connections and buttons to enable passengers without inconvenience to notify the conductor of their desire to leave the car and shall also be equipped with the most serviceable form of fender devices, headlights, sand boxes and gongs.

In addition to the above cars the Company may retain in operation on said streets two hundred fifty-one (251) of the present single-truck cars now in service, it being understood that these cars shall be selected from the best cars now in service and shall conform in every respect to all general ordinances of the city regulating such cars.

All the above cars shall be equipped with sufficient motor capacity to properly operate the cars at the schedule speed required by the service over the particular lines that they may be operated upon. All double-truck cars shall be provided with an effective hand brake and in addition thereto some approved form of power brake.

Each car shall bear appropriate and conspicuous signs upon its sides and ends, so placed as to indicate its route both day and night; at night such signs shall be illuminated.

Electric or hot-water heaters, or heaters of other approved type, of sufficient capacity to heat the above cars as stipulated in accompanying ordinance shall be used.

OTHER ROLLING STOCK.

The Company shall provide all necessary snow-plows, sweepers, repair cars, work cars, etc., to properly take care of its system and maintain it in first-class working condition.

SUPERVISION OF WORK.

All work constructed or reconstructed under these specifications shall be subject to the inspection and approval of the Consulting Engineer of the city who shall be specially authorized to have charge of the work during the reconstruction period.

The Company shall furnish and deliver to the city two (2) complete sets of blue-prints of its drawings made sufficiently in detail to show the general design and general location of all new construction work, placed in the city streets, under these specifications, including track, feeder, conduit and transmission system, and the necessary appurtenances pertaining to them. Both sets of these blue-prints shall be delivered to the duly authorized Consulting Engineer of the city in charge of such work, prior to the beginning of the construction of the work represented by the prints. When each section of the work is begun the Company shall notify said Engineer, giving the date of the beginning of such work, and after the section is completed the Company shall again notify said Engineer, giving the date of completion. After the dates are recorded by the Engineer upon the blue-prints, one set of the prints shall be delivered to the Commissioner of Public Works and kept on file in his office.

TIME OF COMPLETION OF IMPROVEMENTS.

The improvements contemplated by these specifications shall be begun within sixty (60) days after the acceptance of the accompanying ordinance by the Company, and all the work herein outlined shall be prosecuted with due diligence and shall be completed on or before five (5) years from the date of said acceptance, unless delayed by the city or by strikes, riots or other causes beyond the control of the Company. It is understood that the six hundred eighty-two (682) cars above mentioned shall be in operation upon the tracks of the Company within three (3) years from the passage of the accompanying ordinance unless so delayed.

CHANGES OF SPECIFICATIONS.

It is understood that nothing herein shall be construed in such a manner as to prevent the Company from using more expensive and better material than that herein specified on any part of its work, or from doing more work than provided herein.

During the reconstruction period these specifications may be modified in any particular by which a better type of construction can be obtained, upon the joint approval of the Company and the Consulting Engineer of the city and after said period upon the joint approval of the Company and the Commissioner of Public Works.

EXHIBIT B

NORTH CHICAGO STREET RAILROAD COMPANY.

Specifications for Reconstruction and Extensions.

IN GENERAL.

The intention of these specifications is to cover, in a general way, the character and scope of the work to be undertaken and carried out by the North Chicago Street Railroad Company in the improvement of its property to such an extent that the Company will be able to render to the citizens of Chicago the quality and kind of service contemplated by the accompanying ordinance.

UNDERGROUND CONDUIT CONSTRUCTION.

All the underground conduit construction provided for in the ordinance herewith shall conform to the following general specifications:

RAILS.

The rails shall be of steel, shall be not less than nine (9) inches in height, shall weigh not less than one hundred twenty-(120) pounds per yard, and shall be of the "Trilby" type, in which when new, the difference between height of lip and tread shall not be less than three thirty-seconds (3/32) of an inch, or more than six thirty-seconds (6/32) of an inch, and the depth of the groove below the head of the rail, when new, shall not be more than one and one-quarter (1¼) inches.

SLOT RAILS.

Slot rails shall be of the "Z" form, made of steel, shall weigh not less than fifty-seven (57) pounds per yard, and shall be suitably joined by means of bolts and splices.

CONDUCTOR BARS.

Conductor bars shall be of the "T" section, made of steel, shall weigh not less than twenty-one (21) pounds per yard, shall be supported upon suitable insulators spaced not more than fifteen (15) feet apart, and shall be joined together in such a manner as to properly carry the electric current without excessive leakage.

JOINTS.

All rail joints shall be either cast welded, electrically welded, or of a type which will give an equally smooth and even joint.

CAST IRON YOKES.

The yokes shall be of cast iron properly spaced not more than five (5) feet center to center, and shall weigh not less than four hundred fifty (450) pounds each.

GENERAL CLAUSE.

The above rails and yokes shall be supported upon and carried in a concrete roadbed of sufficient strength to sustain the surface load, and provided with man-holes and vaults, properly connected with the city sewers and spaced close enough together to effectively drain the conduits carrying the working conductors and the conduits carrying the feeder and transmission system.

The rails shall be joined to the yokes by means of suitable bolts and lock nuts, and to the slot rails by means of suitable tie bars properly spaced, and in such a manner that they will preserve the opening between the slot rails so that it shall not exceed seven-eighths (7/8) of an inch.

At all points where the working conductor is carried upon insulators, there shall be provided a suitable cast-iron frame and cover of sufficient size to provide easy access to the insulator. All man-holes, sewer connections and other openings exposed to the street surface shall be provided with suitable cast-iron frames and covers, which, together with the frames and covers for the insulators, shall be of ample strength to effectually resist the strains imposed upon them by the heaviest street loads.

SPECIAL WORK.

At all points of intersection of the tracks of the Company with its own tracks or with the tracks of other companies, there shall be provided suitable steel special-work of ample strength and weight to correspond with the rails to which it connects. The frogs, switches and mates shall be provided with wearing plates of hardened steel; and in no case shall rails used in the special-work be of less weight per foot than the weight of the rails to which they join. All special-work and curves shall be laid in concrete in the same general manner required for straight-line track.

PITS AND TERMINALS.

At all points where the underground conduit construction terminates and overhead construction begins, the Company shall construct suitable pits underneath the tracks, of ample size to provide for the removal or the adjustment of the plows attached to the cars. These pits shall be built of brick, concrete or masonry in a thoroughly substantial manner, and shall be of ample strength to effectually resist the heaviest traffic of the streets in which they are laid; it being understood that the construction of these pits shall interfere as little as practicable with the use of the streets for general traffic purposes at the points where the pits are built.

The Company shall also provide suitable plow-hatches, spaced with sufficient frequency to preserve regular and uninterrupted operation of the cars; it being understood that these hatches except at special-work shall not be closer than two thousand (2,000) feet apart.

All covers, man-holes, hatches, pits, conduits, etc., shall be maintained in good order by the Company, and in such a manner as not to interfere with street traffic.

PAVING.

Paving to be laid in connection with underground conduit construction shall conform to the following detailed specifications:

Granite paving blocks shall be used having a uniform grain and texture, without lamination or stratification, and free from an excess of mica or feldspar. Said blocks shall measure from three and one-half (3½) to five and one-half (5½) inches in width, from seven (7) to eleven (11) inches in length (except that shorter stones may be used to break joints), and not less than five (5) inches in depth. They shall be so dressed as to have substantially rectangular plane surfaces, so that when in place the joints at the ends and sides shall average one-quarter (¼) inch in width. Soft or weather-worn stones obtained from the surface of the quarry, and stones which wear to a polish under traffic shall not be used. All blocks shall be laid in uniform courses across the roadway and the space between the blocks, when in place, shall in no case be less than one-eighth (⅛) of an inch nor more than three-eighths (⅜) of an inch in width. Each course shall consist of blocks of the same width. They shall be so laid that all longitudinal joints shall be broken by a lap of approximately three (3) inches. The spaces shall be immediately filled to within two (2) inches of the top of the blocks with dry gravel free from loam and dirt, and the blocks rammed to a true surface and firm bed with a seventy-five (75) pound rammer of approved shape. No cracked or chipped blocks shall remain in the pavement. After ramming, the spaces between the blocks shall be completely filled with a paving pitch made by the distillation of "straight run" coal tar and of such quality and consistency as shall be approved by the Commissioner of Public Works. The pitch shall be used at a temperature of not less than two hundred eighty degrees (280°) Fahrenheit and be spread in such quantity as to apply two (2) gallons to each square yard of pavement. The spreading shall be done in sections if the Commissioner of Public Works so directs.

OVERHEAD ELECTRIC CONSTRUCTION.

All cable track of the Company shall be reconstructed and converted into electric track, and all cable track not designated for underground conduit construction shall be provided with overhead electric construction conforming to the following general specifications, which shall also apply to the reconstruction of any of the present tracks to be operated by electric power from overhead construction and to all additional tracks or extensions to be so operated:

RAILS.

On all said streets or portions thereof where granite, asphalt or brick pavement is laid upon a concrete foundation, a Trilby rail of the section used for underground conduit construction, weighing not less than one hundred twenty (120) pounds per yard shall be laid; but a girder type of rail not less than seven (7) inches in height and weighing not less than eighty-five (85) pounds per yard having a tram of not less than two and three-quarters (2¾) inches may be used on the streets or portions thereof not so paved, provided the difference in elevation between the head of the rail and the wagon tread is not more than one and one-quarter (1¼) inches when the rail is new, and provided further, that at such times as the streets on which the girder rail is laid are paved with granite, asphalt, brick, creosoted block or other similar material on concrete foundation, the Company will substitute Trilby rails of the section used for underground conduit construction weighing not less than one hundred twenty (120) pounds per yard of the above mentioned type, but the Company shall not be compelled on account of the paving or repaving of any street to remove good serviceable rails before being worn out. All rails used in the tunnels and on the approaches may be "T" rail weighing not less than seventy (70) pounds per yard.

JOINTS.

Same as given for underground conduit construction, except that the joint used must be one which will provide a carrying capacity for the electric current equivalent to the carrying capacity of the rail itself.

FOUNDATIONS.

The rails shall be laid upon concrete beams, wooden ties, steel ties or cast-iron chairs or in any other form of first-class modern approved street railway track construction.

PAVING.

The paving in all cases where the said streets or portions thereof are paved with granite, asphalt, or brick pavement on a concrete foundation shall comply with the detailed specifications for granite block pavement as above. If such street paving alongside of tracks shall be asphalt pavement the rails shall be lined on the outside with a ribbon of such granite pavement twelve (12) inches wide.

BONDING AND CROSS-BONDING.

In case the rails are joined by any other form of joint than a cast-welded or electrically-welded joint, there shall be some form of bond used which will connect the ends of the rails together in such manner that the conductivity of the joints shall be equal to the conductivity of the rail. The rails of each single track and the inside rails of the double track of all tracks having overhead electric construction shall be connected together by crossbonds of No. 2/0 (B. & S. gauge) copper wire spaced not more than one thousand (1,000) feet apart, and properly secured to the rails in such manner that the full conducting effect of the wire may be utilized. The rails shall be so bonded or joined and such return circuits and other necessary devices installed as to reasonably and effectually prevent damage from electrolysis.

OVERHEAD CONSTRUCTION.

All new overhead construction shall consist of one (1) trolley wire suspended over each track by span wires attached to poles set at the curb line or suspended from brackets attached to poles.

Poles shall be of iron or steel weighing approximately nine hundred (900) pounds each, set in concrete and kept thoroughly painted. They shall be spaced on an average of from one hundred ten (110) to one hundred fifteen (115) feet apart for straight track except at street intersections and so not to obstruct cross streets, alleys, or private driveways. The location of poles shall be determined by the Commissioner of Public Works.

All material used in the overhead construction shall be of the most modern type and shall be capable of sustaining all the weights and strains that come upon it under normal conditions of operation and from wind, sleet and ordinary accidents.

The trolley wires shall be No. 2/0 (B. & S. gauge) hard-drawn copper. Phosphor bronze, silicon bronze, or other material equal in strength and conductivity may also be used. Trolley wires shall be suspended not less than eighteen and one-half (18½) feet above the rails. There shall be at least two (2) insulations between the trolley wire and the supporting pole. Span wires shall be galvanized steel.

All feeder wires, not required by the accompanying ordinance to be placed under ground, shall be suspended by insulators upon said poles supporting said trolley wires or upon poles placed at the side of streets, alleys or other public ways in locations to be approved by the Commissioner of Public Works. These wires and poles shall be so situated that the Company may make conveniently all the connections provided for in Section 4 of said ordinance. The said trolley wires, feeder wires and all other wires authorized by said ordinance to be installed by the Company may, where located in streets, alleys, or other public ways in, along or across which are located railroads, elevated above the surface of the streets, be strung upon or from the structures of such railroads, with the consent of the company owning or operating the same. Said wires shall be attached to said structures and maintained under the supervision of the City Electrician.

Underground conduits to carry any of the wires authorized by said ordinance to be installed by the Company, shall not exceed four (4) feet in width and three (3) feet in depth, and shall be of tile, cement, iron or other material impervious to moisture and not subject to decay. All transmission and feeder wires and cables laid underground shall be covered with lead or other impervious material. Before any cable containing such wires shall be put in use it shall be tested by an alternating current of twice the working voltage of the cable. All forms of cable used by the Company containing more than one conductor shall be tested in like manner.

GENERAL.

SPACING OF TRACKS.

In laying or relaying rails in any of the streets included in the accompanying ordinance upon which more than one track is to be built the distance between centers of tracks may remain as at present, but in order to accommodate large modern cars and provide for their safe passage, this distance shall be at least nine (9) feet eight and one half (8½) inches between center lines of tracks. The exact location of tracks in the streets shall be subject to the approval of the Commissioner of Public Works.

POWER HOUSE AND SUB-STATIONS.

The present cable plants for supplying power shall be abandoned as soon as practicable and in place thereof one or more electric plants shall be substituted, owned and operated either by the Company or by some other company, capable of furnishing reliable service, and which, together with the necessary sub-stations shall be of sufficient capacity to supply the requisite amount of power to efficiently, successfully and continuously operate not less than three hundred fifteen (315) double-truck cars and the two hundred ten (210) single-truck cars hereinafter mentioned.

In the construction of such plants and sub-stations, the Company shall comply with all general ordinances of the city in regard to buildings and to the installation of machinery, boilers and smoke-consuming appliances. The buildings of said power plants shall be substantially fire-proof and supplied with smoke stacks sufficient to carry off all gases emitted, and the foundations for the machinery therein shall be constructed in a solid and substantial manner.

The machinery and apparatus employed shall be selected and installed with a view of affording uninterrupted operation of the cars upon said railways, and to attain this end the machinery shall be so arranged that a stoppage of one machine shall not prevent the operation of the remaining machines, and reserve machinery shall always be ready to be thrown into service. All boilers, piping, valves, fittings, steam engines, turbines, generators, switch-board apparatus, and other appliances used, shall be of the latest and most approved design and constructed and installed in accordance with the best engineering practice.

In all dynamos and connections where a high-voltage current is produced, or used, approved methods for the protection of human life shall be employed.

The high-tension switches shall be entirely enclosed in a fireproof material, and shall be operated by levers, compressed air, auxiliary currents or by such other means as will, as far as practicable, prevent personal contact with high-tension current.

All feeders leading out of power plants and sub-stations, shall be provided with some form of safety switches or automatic circuit-breakers designed to instantaneously open the circuit in case of a short circuit occurring on the feeder or on the trolley wire which it feeds.

All the foregoing specifications regarding modern and improved apparatus, protection from fire, and provisions for the protection of human life, shall apply with equal force to the sub-stations in case a system of transmission involving the use of sub-stations is adopted.

CAR SHOPS AND MACHINERY.

Suitable shop facilities shall be provided for keeping the machinery, cars and equipment in proper condition for maintaining the service at the standard fixed by the ordinance.

CARS.

The Company shall put into service as rapidly as practicable and operate on its street-railway system three hundred fifteen (315) or more double-truck cars, each capable of seating from forty (40) to fifty-two (52) passengers. These cars shall have center aisles and cross seats which shall face forward except that longitudinal seats seating not to exceed four (4) people may be used at each end of the car and on each side of the car immediately inside the entrances. They shall be vestibuled and shall be supplied with a sufficient number of electric bells, connections and buttons to enable passengers without inconvenience to notify the conductor of their desire to leave the car and shall also be equipped with the most serviceable form of fender devices, headlignts, sand boxes and gongs.

In addition to the above cars the Company may retain in operation on said streets two hundred ten (210) of the present single-truck cars now in service, it being understood that these cars shall be selected from the best cars now in service, and shall conform in every respect to all general ordinances of the city regulating such cars.

All the above cars shall be equipped with sufficient motor capacity to properly operate the cars at the schedule speed required by the service over the particular lines that they may be operated upon. All double-truck cars shall be provided with an effective hand brake and in addition thereto some approved form of power brake.

Each car shall bear appropriate and conspicuous signs upon its sides and ends, so placed as to indicate its route both day and night; at night such signs shall be illuminated.

Electric or hot-water heaters, or heaters of other approved type, of sufficient capacity to heat the above cars as stipulated in accompanying ordinance shall be used.

OTHER ROLLING STOCK.

The Company shall provide all necessary snow-plows, sweepers, repair cars, work cars, etc., to properly take care of its system and maintain it in first-class working condition.

SUPERVISION OF WORK.

All work constructed or reconstructed under these specifications shall be subject to the inspection and approval of the Consulting Engineer of the city who shall be specially authorized to have charge of the work during the reconstruction period.

The Company shall furnish and deliver to the city two (2) complete sets of blue-prints of its drawings made sufficiently in detail to show the general design and general location of all new construction work placed in the city streets, under these specifications, including track, feeder, conduit and transmission system, and the necessary appurtenances pertaining to them. Both sets of these blue-prints shall be delivered to the duly authorized Consulting Engineer of the city in charge of such work prior to the beginning of the construction of the work represented by the prints. When each section of the work is begun the Company shall notify said Engineer, giving the date of the beginning of such work and after the section is completed the Company shall again notify said Engineer, giving the date of completion. After the dates are recorded by the Engineer upon the blue-prints, one set of the prints shall be delivered to the Commissioner of Public Works and kept on file in his office.

TIME. OF COMPLETION OF IMPROVEMENTS.

The improvements contemplated by these specifications shall be begun within sixty (60) days after the acceptance of the accompanying ordinance by the Company, and all the work herein outlined shall be prosecuted with due diligence and shall be completed on or before five (5) years from the date of said acceptance, unless delayed by the city or by strikes, riots or other causes beyond the control of the Company. It is understood that the three hundred fifteen (315) cars above mentioned shall be in operation upon the tracks of the Company within three (3) years from the passage of the accompanying ordinance unless so delayed.

CHANGES OF SPECIFICATIONS.

It is understood that nothing herein shall be construed in such a manner as to prevent the Company from using more expensive and better material than that herein specified on any part of its work, or from doing more work than provided herein.

During the reconstruction period these specifications may be modified in any particular by which a better type of construction can be obtained, upon the joint approval of the Company and the Consulting Engineer of the city, and after said period upon the joint approval of the Company and the Commissioner of Public Works.

EXHIBIT B

WEST CHICAGO STREET RAILROAD COMPANY.

Specifications For Reconstruction and Extensions.

IN GENERAL.

The intention of these specifications is to cover, in a general way, the character and scope of the work to be undertaken and carried out by the West Chicago Street Railroad Company, in the improvement of its property to such an extent that the Company will be able to render to the citizens of Chicago the quality and kind of service contemplated by the accompanying ordinance.

UNDERGROUND CONDUIT CONSTRUCTION.

All the underground conduit construction provided for in the ordinance herewith shall conform to the following general specifications:

RAILS.

The rails shall be of steel, shall be not less than nine (9) inches in height, shall weigh not less than one hundred twenty (120) pounds per yard, and shall be of the "Trilby" type, in which, when new, the difference between height of lip and tread shall not be less than three thirty-seconds (3/32) of an inch or more than six thirty-seconds (6/32) of an inch and the depth of the groove below the head of the rail, when new, shall not be more than one and one-quarter (1¼) inches.

SLOT RAILS.

Slot rails shall be of the "Z" form, made of steel, shall weigh not less than fifty-seven (57) pounds per yard, and shall be suitably joined by means of bolts and splices.

CONDUCTOR BARS.

Conductor bars shall be of the "T" section, made of steel, shall weigh not less than twenty-one (21) pounds per yard, shall be supported upon suitable insulators spaced not more than fifteen (15) feet apart, and shall be joined together in

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such a manner as to properly carry the electric current without excessive leakage.

JOINTS.

All rail joints shall be either cast welded, electrically welded, or of a type which will give an equally smooth and even joint.

CAST IRON YOKES.

The yokes shall be of cast iron properly spaced not more than five (5) feet center to center and shall weigh not less than four hundred fifty (450) pounds each.

GENERAL CLAUSE.

The above rails and yokes shall be supported upon and carried in a concrete roadbed of sufficient strength to sustain the surface load, and provided with man-holes and vaults, properly connected with the city sewers and spaced close enough together to effectively drain the conduits carrying the working conductors and the conduits carrying the feeder and transmission system.

The rails shall be joined to the yokes by means of suitable bolts and lock nuts, and to the slot rails by means of suitable tie bars properly spaced, and in such a manner that they will preserve the opening between the slot rails so that it shall not exceed seven-eighths (7/8) of an inch.

At all points where the working conductor is carried upon insulators, there shall be provided a suitable cast-iron frame and cover of sufficient size to provide easy access to the insulator. All man-holes, sewer connections and other openings exposed to the street surface shall be provided with suitable cast-iron frames and covers, which, together with the frames and covers for the insulators, shall be of ample strength to effectually resist the strains imposed upon them by the heaviest street loads.

SPECIAL WORK.

At all points of intersection of the tracks of the Company with its own tracks or with the tracks of other companies, there shall be provided suitable steel special-work of ample strength and weight to correspond with the rails to which it connects. The frogs, switches and mates shall be provided with wearing plates of hardened steel; and in no case shall rails used in the special-work be of less weight per foot than the weight of the rails to which they join. All special-work and curves shall be laid in concrete in the same general manner required for straight-line track.

PITS AND TERMINALS.

At all points where the underground conduit construction terminates and overhead construction begins, the Company shall construct suitable pits underneath the tracks, of ample size to provide for the removal or the adjustment of the plows attached to the cars. These pits shall be built of brick, concrete or masonry in a thoroughly substantial manner, and shall be of ample strength to effectually resist the heaviest traffic of the streets in which they are laid; it being understood that the construction of these pits shall interfere as little as practicable with the use of the streets for general traffic purposes at the points where the pits are built.

The Company shall also provide suitable plow-hatches, spaced with sufficient frequency to preserve regular and uninterrupted operation of the cars; it being understood that these hatches, except at special-work, shall not be closer than two thousand (2,000) feet apart.

All covers, man-holes, hatches, pits, conduits, etc., shall be maintained in good order by the Company, and in such a manner as not to interfere with street traffic.

PAVING.

Paving to be laid in connection with underground conduit construction shall conform to the following detailed specifications:

Granite paving blocks shall be used having a uniform grain and texture, without lamination or stratification, and free from an excess of mica or feldspar. Said blocks shall measure from three and one-half (3½) to five and one-half (5½) inches in width, from seven (7) to eleven (11) inches in length (except that shorter stones may be used to break joints), and not less than five (5) inches in depth. They shall be so dressed as to have substantially rectangular plane surfaces, so that when in place the joints at the ends and sides shall average one-quarter (¼) inch in width. Soft or weather-worn stones obtained from the surface of the quarry, and stones which wear to a polish under traffic shall not be used. All blocks shall be laid in uniform courses across the roadway and the space between the blocks, when in place, shall in no case be less than one-eighth (⅛) of an inch nor more than three-eighths (⅜) of an inch in width. Each course shall consist of blocks of the same width. They shall be so laid that all longitudinal joints shall be broken by a lap of approximately three (3) inches. The spaces shall be immediately filled to within two (2) inches of the top of the blocks with dry gravel free from loam and dirt, and the blocks rammed to a true surface and firm bed with a seventy-five (75) pound rammer of approved shape. No cracked or chipped blocks shall remain in the pavement. After ramming, the spaces between the blocks shall be completely filled with a paving pitch made by the distillation of "straight run" coal tar and of such quality and consistency as shall be approved by the Commissioner of Public Works. The pitch shall be used at a temperature of not less than two hundred eighty degrees (280°) Fahrenheit and be spread in such quantity as to apply two (2) gallons to each square yard of pavement. The spreading shall be done in sections if the Commissioner of Public Works so directs.

OVERHEAD ELECTRIC CONSTRUCTION.

All cable track of the Company shall be reconstructed and converted into electric track, and all cable track not designated for underground conduit construction shall be provided with overhead electric construction conforming to the following general specifications, which shall also apply to the reconstruction of any of the present tracks to be operated by electric power from overhead construction and to all additional tracks or extensions to be so operated; provided, that in the reconstruction of said cable track all rails and track appurtenances now in use shall be removed as far as necessary to permit the placing of the new construction, and replaced with new rails and track appurtenances except on certain parts of said lines where the rails are now new or nearly new, said parts of said lines being as follows: Madison Street from Paulina Street to 40th Avenue; Milwaukee Avenue from Chicago Avenue to Division Street; Desplaines Street from Milwaukee Avenue to Washington Street; Halsted Street from O'Neil Street to Harrison Street, and Van Buren Street from Halsted Street to Clinton Street; but on all parts of said cable lines whereon it is above provided that the present rails and track appurtenances shall remain, the slot rails shall nevertheless be removed, the conduits filled, and the pavement between the rails of each track placed in first-class condition, and the rail joints and the bonding and cross-bonding of said tracks shall be as provided below.

RAILS.

On all of said streets or portions thereof where granite, asphalt or brick pavement is laid upon a concrete foundation, a Trilby rail of the section used for underground conduit construction, weighing not less than one hundred twenty (120) pounds per yard, shall be laid; but a girder type of rail not less than seven (7) inches in height and weighing not less than eighty-five (85) pounds per yard, having a tram of not less than two and three-quarters (2¾) inches, may be used on the streets or portions thereof not so paved, provided the difference in elevation between the head of the rail and the wagon tread is not more than one and one-quarter (1¼) inches when the rail is new, and provided further, that at such times as the streets on which the girder rail is laid are paved with granite, asphalt, brick. creosoted block or other similar material on concrete foundation, the Company will substitute Trilby rails of the section used for underground conduit construction weighing not less than one hundred twenty (120) pounds per yard of the above mentioned type, but the Company shall not be compelled on account of the paving or repaving of any street to remove good serviceable rails before being worn out.

All rails used in the tunnels and on the approaches may be "T" rails weighing not less than seventy (70) pounds per yard.

JOINTS.

Same as given for underground conduit construction, except that the joint used must be one which will provide a carrying capacity for the electric current equivalent to the carrying capacity of the rail itself.

FOUNDATIONS.

The rails shall be laid upon concrete beams, wooden ties, steel ties or cast-iron chairs or in any other form of first-class modern approved street-railway track construction.

PAVING.

The paving in all cases where the said streets or portions thereof are paved with granite, asphalt or brick pavement on a concrete foundation shall comply with the detailed specifications for granite block pavement as above. If such street paving alongside of tracks shall be asphalt pavement the rails shall be lined on the outside with a ribbon of such granite pavement twelve (12) inches wide.

BONDING AND CROSS-BONDING.

In case the rails are joined by any other form of joint than a cast-welded or electrically-welded joint, there shall be some form of bond used which will connect the ends of the rails together in such manner that the conductivity of the joints shall be equal to the conductivity of the rail. The rails of each single track and the inside rails of the double track of all tracks having overhead electric construction shall be connected together by cross-bonds of No. 2/0 (B. & S. gauge) copper wire spaced not more than one thousand (1,000) feet apart, and properly secured to the rails in such manner that the full conducting effect of the wire may be utilized. The rails shall be so bonded or joined and such return circuits and other necessary devices installed as to reasonably and effectually prevent damage from electrolysis.

OVERHEAD CONSTRUCTION.

All new overhead construction shall consist of one (1) trolley wire suspended over each track by span wires attached to poles set at the curb line or suspended from brackets attached to poles.

Poles shall be of iron or steel weighing approximately nine hundred (900) pounds each, set in concrete and kept thoroughly painted. They shall be spaced on an average of from one hundred ten (110) to one hundred fifteen (115) feet apart. for straight track, except at street intersections, and so not to obstruct cross streets, alleys or private driveways. The location of poles shall be determined by the Commissoner of Public Works.

All material used in the overhead construction shall be of the most modern type and shall be capable of sustaining all the weights and strains that come upon it under normal conditions of operation and from wind, sleet and ordinary accidents.

The trolley wires shall be No. 2/0 (B. & S. gauge) hard-drawn copper. Phosphor bronze, silicon bronze, or other material equal in strength and conductivity may also be used. Trolley wires shall be suspended not less than eighteen and one-half (18½) feet above the rails. There shall be at least two (2) insulations between the trolley wire and the supporting pole. Span wires shall be galvanized steel.

All feeder wires, not required by the accompanying ordinance to be placed under ground, shall be suspended by insulators upon said poles supporting said trolley wires or upon poles placed at the side of streets, alleys or other public ways in locations to be approved by the Commissioner of Public Works. These wires and poles shall be so situated that the Company may make conveniently all the connections provided for in Section 4 of said ordinance. The said trolley wires, feeder wires and all other wires authorized by said ordinance to be installed by the Company may, where located in streets, alleys, or other public ways in, along or across which are located railroads, elevated above the surface of the streets, be strung upon or from the structures of such railroads, with the consent of the company owning or operating the same. Said wires shall be attached to said structures and maintained under the supervision of the City Electrician.

Underground conduits to carry any of the wires authorized by said ordinance to be installed by the Company, shall not exceed four (4) feet in width and three (3) feet in depth, and shall be of tile, cement, iron, or other material impervious to moisture and not subject to decay. All transmission and feeder wires and cables laid under ground shall be covered with lead or other impervious material. Before any cable containing such wires shall be put in use it shall be tested by an alternating current of twice the working voltage of the cable. All forms of cable used by the Company containing more than one conductor shall be tested in like manner.

GENERAL.

SPACING OF TRACKS.

In laying or relaying rails in any of the streets included in the accompanying ordinance upon which more than one track is to be built, the distance between centers of tracks may remain as at present, but in order to accommodate large, modern cars and provide for their safe passage this distance shall be at least nine (9) feet eight and one-half (8½) inches between center lines of tracks. The exact location of tracks in the streets shall be subject to the approval of the Commissioner of Public Works.

POWER HOUSE AND SUB-STATIONS.

The present cable plants for supplying power shall be abandoned as soon as practicable and in place thereof one or more electric plants shall be substituted, owned and operated either by the Company or by some other company, capable of furnishing reliable service, and which, together with the necessary sub-stations, shall be of sufficient capacity to supply the requisite amount of power to efficiently, successfully and continuously operate not less than five hundred eighty-five (585) double-truck cars and the three hundred ninety (390) single-truck cars hereinafter mentioned.

In the construction of such plants and sub-stations, the Company shall comply with all general ordinances of the city in regard to buildings and to the installation of machinery, boilers and smoke-consuming appliances. The buildings of said power plants shall be substantially fire-proof and supplied with smoke-stacks sufficient to carry off all gases emitted, and the foundations for the machinery therein shall be constructed in a solid and substantial manner.

The machinery and apparatus employed shall be selected and installed with a view of affording uninterrupted operation of the cars upon said railways, and to attain this end the machinery shall be so arranged that a stoppage of one machine shall not prevent the operation of the remaining machines, and reserve machinery shall always be ready to be thrown into service. All boilers, piping, valves, fittings, steam engines, turbines, generators, switchboard apparatus, and other appliances used shall be of the latest and most approved design and constructed and installed in accordance with the best engineering practice.

In all dynamos and connections where a high-voltage current is produced or used approved methods for the protection of human life shall be employed.

The high-tension switches shall be entirely enclosed in fireproof material, and shall be operated by levers, compressed air, auxiliary currents, or by such other means as will, as far as practicable, prevent personal contact with high-tension current.

All feeders leading out of power plants and sub-stations shall be provided with some form of safety switches or automatic circuit-breakers designed to instantaneously open the circuit in case of a short circuit occurring on the feeder or on the trolley wire which it feeds.

All the foregoing specifications regarding modern and approved apparatus, protection from fire, and provisions for the protection of human life, shall apply with equal force to the sub-stations in case a system of transmission involving the use of sub-stations is adopted.

CAR SHOPS AND MACHINERY.

Suitable shop facilities shall be provided for keeping the machinery, cars and equipment in proper condition for maintaining the service at the standard fixed by the ordinance.

CARS.

The Company shall put into service as rapidly as practicable and operate on its street railway system five hundred eighty-five (585) or more double-truck cars, each capable of seating from forty (40) to fifty-two (52) passengers. These cars shall have center aisles and cross seats, which shall face forward, except that longitudinal seats seating not to exceed four (4) people may be used at each end of the car, and on each side of the car, immediately inside the entrances. They shall be vestibuled and shall be supplied with a sufficient number of electric bells, connections and buttons to enable passengers without inconvenience to notify the conductor of their desire to leave the car, and shall also be equipped with the most serviceable form of fender devices, headlights, sand boxes and gongs.

In addition to the above cars, the Company may retain in operation on said streets three hundred ninety (390) of the present single-truck cars now in service, it being understood that these cars shall be selected from the best cars now in service and shall conform in every respect to all general ordinances of the city regulating such cars.

All the above cars shall be equipped with sufficient motor capacity to properly operate the cars at the schedule speed required by the service over the particular lines that they may be operated upon. All double-truck cars shall be provided with an effective hand brake and in addition thereto some approved form of power brake.

Each car shall bear appropriate and conspicuous signs upon its sides and ends, so placed as to indicate its route both day and night; at night such signs shall be illuminated.

Electric or hot-water heaters, or heaters of other approved type, of sufficient capacity to heat the above cars as stipulated in accompanying ordinance, shall be used.

OTHER ROLLING STOCK.

The Company shall provide all necessary snow-plows, sweepers, repair cars, work cars, etc., to properly take care of its system and maintain it in first-class working condition.

SUPERVISION OF WORK.

All work constructed or reconstructed under these specifications shall be subject to the inspection and approval of the Consulting Engineer of the city, who shall be specially authorized to have charge of the work during the reconstruction period.

The Company shall furnish and deliver to the city two (2) complete sets of blue-prints of its drawings, made sufficiently in detail to show the general design and general location of all new construction work placed in the city streets under these specifications, including track, feeder, conduit and transmission system and the necessary appurtenances pertaining to them. Both sets of these blue-prints shall be delivered to the duly authorized Consulting Engineer of the city in charge of such work, prior to the beginning of the construction of the work represented by the prints. When each section of the work is begun the Company shall notify said Engineer, giving the date of the beginning of such work, and after the section is completed the Company shall again notify said Engineer, giving the date of completion. After the dates are recorded by the Engineer upon the blue-prints, one set of the prints shall be delivered to the Commissioner of Public Works and kept on file in his office.

TIME OF COMPLETION OF IMPROVEMENTS.

The improvements contemplated by these specifications shall be begun within sixty (60) days after the acceptance of the accompanying ordinance by the Company, and all the work herein outlined shall be prosecuted with due diligence and shall be completed on or before five (5) years from the date of said acceptance, unless delayed by the city or by strikes, riots or other causes beyond the control of the Company. It is understood that the five hundred eighty-five (585) cars above mentioned shall be in operation upon the tracks of the Company within three (3) years from the passage of the accompanying ordinance unless so delayed.

CHANGES OF SPECIFICATIONS.

It is understood that nothing herein shall be construed in such a manner as to prevent the Company from using more expensive and better material than that herein specified on any part of its work, or from doing more work than provided herein.

During the reconstruction period these specifications may be modified in any particular by which a better type of construction can be obtained, upon the joint approval of the Company and the Consulting Engineer of the city, and, after said period, upon the joint approval of the Company and the Commissioner of Public Works.

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